CLAIMS

1. A method for motion estimation using adaptive patterns in a video sequence compression system, comprising the steps of:

(a) determining an initial search pattern located at a center of a search window in a block of a video frame;

(b) searching a location of a minimum block distortion measure (BDM) in the initial search pattern;

(c) determining a horizontal search pattern for functioning on the search window in the horizontal direction to search a location of a minimum BDM in the horizontal search pattern;

(d) determining a vertical search pattern for operating on the search window in the vertical direction to search a location of a minimum BDM in the vertical search pattern;

(e) designating the location of the minimum BDM in the initial search pattern to be a motion vector;

(f) designating the location of the minimum BDM in the horizontal search pattern to be a motion vector;

(g) designating the location of the minimum BDM in the vertical search pattern to be a motion vector;

(h) determining a search pattern to be used in a subsequent searching stage based on the location of the minimum BDM in the initial search pattern;

(i) determining a search pattern to be used in a subsequent searching stage based on the location of the minimum BDM in the horizontal search pattern; and

(j) determining a search pattern to be used in a subsequent searching stage based on the location of the minimum BDM in the vertical search pattern.

2. The method of claim 1, wherein ones of the locations on the initial search pattern, the horizontal search pattern and the vertical search pattern are overlapped and the

overlapped search location is excluded in determining a BDM.

3. The method of claim 2, wherein the initial search pattern includes 4n+1 search locations which is formed of a single one at the center of the initial search pattern and 2n in each of the vertical and the horizontal direction from the center thereof, the horizontal search pattern for functioning in the horizontal direction includes hexagonal 8n search locations which is formed of 2n in a top row, 4n in a middle row and 2n in a bottom low, and the vertical search pattern for operating in the vertical direction includes hexagonal 8n search locations which is formed of 2n in a left side column, 4n in a middle column and 2n in a right side column, n being a positive integer.

4. The method of claim 3, wherein the step (h) includes the steps of:

(h1) determining the vertical search pattern to be a search pattern to be used in a subsequent searching stage in case a minimum BDM occurs at one of the 2n search locations in each of the top and the bottom row;

(h2) determining the horizontal search pattern to be a search pattern to be used in a subsequent searching stage in case a minimum BDM is found at one of the 2n search locations in each of the left and the right side column; and

(h3) ending a search process in case a minimum BDM corresponds to the center.

5. The method of claim 4, wherein the step (i) includes the steps of:

(i1) ending a search process in case a minimum BDM occurs at one of 2n search locations in a center of the middle row;

(i2) selecting the horizontal search pattern for a subsequent searching stage in case a minimum BDM is found at one of the search locations of both sides except the 2n

search locations in the center of the middle row; and

(i3) selecting the vertical search pattern for a subsequent searching stage in case a minimum BDM is at one of the search locations in the top and the bottom row.

6. The method of claim 5, wherein the step (j) includes the steps of:

(j1) ending a search process in case a minimum BDM occurs at one of 2n search locations in a center of the middle column;

(j2) selecting the vertical search pattern for a subsequent searching stage in case a minimum BDM is found at one of vertical search locations except the 2n search locations in the center of the middle column; and

(j3) selecting the horizontal search pattern for a subsequent searching stage in case a minimum BDM is at one of the search locations in the 4n number of search locations in the left and the right column.

7. An apparatus for motion estimation using adaptive search patterns for a video sequence compression, comprising;

a current image block generation means for generating a current image block;

a previous image block generation means for generating a previous image block;

a first and a second memory for storing the image blocks generated by the current image block generation means and the previous image block generation means; and

a pattern determination and motion estimation means for retrieving data of image block stored in the first and the second memory to search a location of a minimum BDM in a current search pattern of the data of the retrieved image block and determining a next search pattern to be used in a subsequent searching stage depending on the location of the minimum BDM.

8. The apparatus of claim 7, wherein the pattern determination and motion estimation means repeatedly estimates a new search pattern to be used in a subsequent searching stage based on a result of a search process performed by using the next search patterns.